UNDERGRADUATE PROGRAM HANDBOOK

Department Of Electrical & Computer Engineering

120-CREDIT PROGRAM

ACADEMIC YEAR
2020-2022

MORGAN STATE UNIVERSITY

Welcome from the Chair

Welcome to the Electrical and Computer Engineering Department! This handbook will give you a sense of our department's key attributes that make us one of the most competitive electrical engineering departments on a national scale.

Our department strives to be at the forefront of both innovative research and creative pedagogy that, in turn, provides a rich, dynamic academic environment for our undergraduate and graduate students. Faculty and staff give the highest priority to service our students to help prepare our graduates for life-long learning, empower them to succeed in graduate school, and to excel and lead in their professional careers. The implementation of this philosophy assures a high degree of interaction between the faculty and students at all levels.

We have dedicated faculty who hail from diverse academic origins and possess a broad span of research interests. Our technical interactions with industry and government are increasingly important toward the goal of maintaining the relevance of our graduate and undergraduate programs. We value the guidance of these entities as we work together to help satisfy the demand for quality highly skilled engineers to enter the national and global workforce. Our alumni are an extremely important part of this program supplying the resources and support through various mechanisms including philanthropic and mentoring actions.

Review further the information regarding our research, educational programs, and accomplishments. I invite you to explore these pages and hope you will find something at Morgan that will bring us to meet in the near future. Please do not hesitate to contact me or any department faculty member or staff for additional information.

Sincerely,

Craig Scott, Ph.D.
Professor & Chair
Department of Electrical and Computer Engineering

PROGRAM HANDBOOK

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A. DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ACCREDITATION

Morgan State University is fully accredited by the Middle States Association of Colleges and Secondary Schools. The Electrical Engineering program was founded in September 1984 and Bachelor of Science in Electrical Engineering degree program "is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org."

THE MAJOR IN ELECTRICAL ENGINEERING

The Department of Electrical and Computer Engineering provides its students the opportunity to apply mathematical and physical concepts to engineering problems early in the curriculum, through laboratory and design experiences. The Department has been following the philosophy of design across the curriculum for some time. In addition to the strong design experience integrated throughout the required courses, the electives offer students the opportunity to enhance their skills with additional open-ended problem solving. These problems are broad-based, incorporating knowledge from specialty areas of communications systems, signal processing, microwave systems, solid state electronics, controls and automation, power, computer engineering and cyber security. The computer engineering and cyber security emphases are special components of the electrical engineering (EE) program, where the Department offers a concentration in these areas within its EE program. This expands and rounds out the program by providing the necessary tools to meet the demands of the information age.

ELECTRICAL ENGINEERING DEGREE PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The PEOs are consistent with those of the School of Engineering. In striving to develop a program of the highest quality, the program seeks to instill in its students the confidence and competence required to meet the challenges associated with careers in electrical and computer engineering. The primary objective of the EE program is to develop a challenging and adaptive curriculum which continuously fosters excellence, breadth, and depth. Within this framework the Department will produce students that will:

A. Remain effective in their employment in engineering and other professional career fields.
B. Facilitate innovation and synthesis of new products and services, as well as improve existing products, in a global context.
C. Continue to be leaders and/or contributors in their profession, community and organizations.
D. Continue the learning process throughout their careers.
E. Provide service to their profession and community-at-large.

B. ELECTRICAL ENGINEERING DEGREE PROGRAM STUDENT OUTCOMES

The Electrical Engineering degree program student outcomes serves as specific guidelines and standards of the core knowledge, skills and abilities, that students are expected to achieve by the time of graduation. The outcomes also indicate the minimum standards of achievement for students matriculating through the program.

Students who graduate with a Bachelor of Science in Electrical Engineering degree from our department at Morgan State University will demonstrate:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

C. STUDENT ADVISING

Getting proper advisement during your undergraduate program is essential to your success in graduating on time, as well as being intellectually prepared to pursue your next endeavor in life, whether that is pursuing a higher degree in the field or a career as an electrical engineer.

In our department we pay close attention to the progress of our students in their curriculum. The advisement process for the Electrical Engineering department is as follows:

- Freshmen – are advised by the Office of Student Success and Retention (OSSR) Coordinators and the Director of Engineering, 1st Year Experience (Honor Students).
- Sophomores – All sophomores are advised by designated School of Engineering (SOE) Advisors until you have successfully completed core 200-level EEGR courses (ie. EEGR 202, EEGR 203, EEGR 211, EEGR 215, EEGR 221). These advisors will contact you via email to advise you virtually or to schedule an appointment via ***Starfish***;
- Juniors – All Juniors who have successfully completed core 200-level EEGR courses (ie. EEGR 202, EEGR 203, EEGR 211, EEGR 215, EEGR 221) are advised by designated Electrical Engineering faculty. All students should schedule an appointment via email or ***Starfish*** requesting an appointment to be advised virtually or in person;
- Seniors – All Seniors are advised by designated Electrical Engineering faculty. All students should schedule an appointment via email or starfish requesting an appointment to be advised virtually or in person; Graduating seniors in their last semester will be advised by the Department Chairperson.
- Transfer – All Transfer students must complete the University Transfer process. This process can be found by going to The Office of Transfer Student Programming website, https://www.morgan.edu/tsp, and completing the Transfer Student Online Orientation. Once a student has completed that process, the student will receive an email from soetransfer@morgan.edu to be advised virtually or in person.

During your undergraduate study, registration for courses will be allowed only with the approval of your advisor. You will need to fill out an advisement form and get your advisor's signature on that form. Later, a SOE Student Support staff member will remove the advising hold from your account so that you can register for the classes you have been advised. Sample advisement forms (Freshmen, Transfer, and Continuing) are available from the Engineering - Office of Student Support.

General Student Advising

Every student that successfully completes core 200-level EEGR courses (ie. EEGR 202, EEGR 203, EEGR 211, EEGR 215, EEGR 221) will be assigned a permanent electrical engineering faculty academic advisor. The faculty academic advisor plays a significant role in the educational and professional development of the electrical engineering major. This faculty advisor provides vital information about the Electrical and Computer Engineering Department's curriculum,

courses, and activities, and serves as a guide to the student in preparing course schedules from the junior through senior year. Students are encouraged to get to know their advisors early on, just as the advisor will need to know the student, to assist them in navigating the electrical engineering program and accomplishing their goals. The faculty advisor approves all course schedules and any changes that are made. You will be assigned to one of our department faculty advisors just before you start taking core 300-level EEGR courses. The advisor/advisee list will be available from the Electrical and Computer Engineering Department office.

At the end of each semester, each student is required to update their Student Academic Status using the **Degree Works portal**. A pdf of the semester status from Degree Works should be presented to the faculty advisor each time a discussion regarding courses is held. To access Degree Works, students login into WEBSIS using their Morgan Email account and use their unofficial academic transcript as a starting point.

During the first semester of the junior year, prior to registration, each student will be required to submit a printed copy of their Degree Works Academic Status to their designated EE Senior Student Advisor. The completed audit represents a Plan of Study, which indicates the courses planned for each semester until graduation.

D. REGISTRATION PROCESS FOR FRESHMEN AND TRANSFER STUDENTS

Freshman Student (Fall Semester)

- ✓ Take placement test and get profile report as part of ACCESS Orientation Program
- ✓ Report to engineering orientation as a group with profile report and sign roster for the major department; pick up SOAR booklet; submit profile report for copies to the Director of Engineering, 1st Year Experience
- ✓ Complete engineering orientation and advisement in SEB241
- ✓ Break up by major and go to SCH 114 or MEB 140 for advisement and registration
- ✓ Check student account summary to ensure that the student is billed correctly as a Resident or Non-Resident
- ✓ Submit copy of schedule, and advising form - class schedule is checked to verify that students have registered in accordance with advisement form
- ✓ Copies of schedule and advisement form sent to department
  - Students who need assistance with math or science course registration – email soeoverride@morgan.edu
  - Students with advisor holds can – see OSSR Staff
  - Students with admission hold/financial hold - see OSSR Staff

Freshman Student (Spring Semester)

- ✓ Complete ACCESS Orientation
- ✓ Take placement test and retrieve profile report
- ✓ Report to engineering orientation with profile report and sign roster for the major department; pick up SOAR booklet; submit profile report for copies to the Director of Engineering 1st Year Experience
- ✓ Complete SOAR orientation and advisement in SEB241
- ✓ See the **Retention Coordinators** for advising
- ✓ After advisement go to computer lab with advisement form to register
- ✓ Register with assistance from student support staff
- ✓ Submit copy of schedule, and advising form - class schedule is checked to verify that students have registered in accordance with advisement form
- ✓ Check student account summary to ensure that the student is billed correctly as a Resident or Non-Resident
- ✓ Copies of schedule and advisement form sent to department

Transfer Student (Fall and Spring Semesters)

- ✓ Transfer – All Transfer students must complete the University Transfer process. This process can be found by going to The Office of Transfer Student Programming website, https://www.morgan.edu/tsp, and completing the Transfer Student Online Orientation. Once a student has completed that process the student will receive an email from soetransfer@morgan.edu to be advised virtually or in person.
- ✓ Submit copy of schedule, student account summary and advising form via Docusign- class schedule is checked to verify that students have registered in accordance with advisement form
- ✓ Copies of schedule, advisement form, student account summary sent to department

Late Registration (Freshmen)

- ✓ Take placement test and get profile report
- ✓ Report to the **Coordinators,** for processing- **do not go to department first!!!**
- ✓ Return to Student Support Staff for assistance with registration
- ✓ When registration is complete, report to Student Support Staff office for checkout
  - Students who need assistance with math course registration see soeoverride@morgan.edu
  - Students with advisor holds can see Student Support Staff
  - See Student Support Staff for admission hold/financial hold

Transfer Students Late Registration

- ✓ Transfer – All Transfer students must complete the University Transfer process. This process can be found by going to The Office of Transfer Student Programming website, https://www.morgan.edu/tsp, and completing the Transfer Student Online Orientation. Once a student has completed that process the student will receive an email from soetransfer@morgan.edu to be advised virtually or in person.
- ✓ Submit copy of schedule, student account summary and advising form - class schedule is checked to verify that students have registered in accordance with advisement form
- ✓ Copies of schedule, advisement form, student account summary sent to department
- ✓ Report to Student Support Staff office for processing- **do not go to department first!!!**

Override Request

If you need an override for a session that is closed, you need to initiate an electronic override request from Searchlight [**Searchlightpa.com/form/ece_override**] . For courses that require departmental approval (i.e 440, 490, 491, 498), an override request must be submitted through Searchlight. Students who need to take graduate courses will need to petition the School of Graduate Studies (SOGS). Upon approval from both the SOGS and the undergraduate coordinator, students will then be allowed to submit an override request, to register into the courses. For further information, please call SOGS at 443.885.3185 or SOGS Online Student Forms

Student Advisement Key Personnel:

Director of Engineering, 1st Year Experience, Transfer Coordinator, School of Engineering Support Services	Dr. Monica Poindexter Mitchell Engineering Building Rm 108 443-885-4312 MONICA.POINDEXTER@MORGAN.EDU
Assistant Dean of Academic Student Success	Dr. Monica Poindexter Mitchell Engineering Building Rm 108 443-885-4312 MONICA.POINDEXTER@MORGAN.EDU
ECE Graduating Senior Student Advisor	Dr. Craig Scott Schaefer Engineering Building Rm 224 443-885-3073 CRAIG.SCOTT@MORGAN.EDU
OSSR Retention Coordinators	Ms. Myra Curtis Mitchell Engineering Building Rm 206 443-885-4210 MYRA.CURTIS@MORGAN.EDU Mr. Lafaun Davis Mitchell Engineering Building Rm 205 443-885-1026 LAFAUN.DAVIS@MORGAN.EDU
ECE General Student Advisement (General Advisement for curriculum Jr. & Sr.)	ECE Full-Time Faculty

E. REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (B.S.E.E.)

A minimum of 120 credit hours (See **Table *1***) are required of students pursuing the Bachelor of Science Degree in Electrical Engineering (B.S.E.E.). These credit hours are distributed as follows:

Table 1: Requirement for 120-Credit Hours

Course Category	Credit
1. General Education and University Requirements – Group A	45
2. Mathematics and Science Requirements – Group B	19
3. Electrical Engineering Core Requirements – Group C	38
4. Electives or Concentration Requirements – Group D, E, or F	18
Total	120

Students must complete all of the requirements in course groups A, B, C and (D or E or F).

-Group D courses are general EE elective courses for Electrical Engineering degree [**Group D: Electrical Engineering Electives Requirements (18 credits)**]

-Group E courses are specifically for Electrical Engineering–Computer Engineering (EE-CE) track [**Group E: Electrical Engineering – Computer Engineering Concentration Requirements (18 credits)**].

-Group F courses are specifically for the Cyber Security track [**Group F: Electrical Engineering – Cyber Security Track Requirements (18 credits)**].

Note Well: The last 30 credits must be taken at Morgan State University.

Group A: General Education and University Requirements (45 credits)

General education requirements are set by the university, and you need to take these courses in the relevant departments. The required general education courses for the Electrical and Computer Engineering program are detailed in **Table 2**. Description of the courses may be found in the department catalogs at http://www.morgan.edu/academics/academic_catalogs.html

40-CREDITS GENERAL EDUCATION REQUIREMENT (REVISED)*

Table 2: General Ed and University Requirements – Group A

Course #	Course Title	Credit
CHEM 110 + Lab	General Chemistry for Engineers + Lab (BP)	4
ECON 211	Principles of Economics (SB)	3
EEGR 161	Intro to C Programming (IM)	3
ENGL101	Freshman Composition I (EC)	3
ENGL 102	Freshman Composition II (EC) [Prerequisite: ENGL 101]	3
HEED 103	Health Education	3
HIST 350	Introduction to African Diaspora (CI)	3
MATH 241	Calculus I (MQ)	4
OREN 104	Freshmen Orientation for School of Engineering	1
PHEC XXX	Physical Education	1
PHIL 109	Introduction to Logic (CT)	3
PHYS 205+Lab	University Physics I + Lab (BP) [Prerequisite: MATH 241]	5
XXXX (AH)	2 Approved Arts and Humanities courses (AH)	6
XXXX (SB)	1 Approved Social and Behavioral Science courses (SB)	3
Total	**General Education and University Requirements**	**45**

Note Well: Students must select two courses from the following list of approved Arts and Humanities (AH) courses (See Table 3), for a total of 6 credits.

Table 3: Approved Arts and Humanities courses (AH)

Course # **3-credits each**	Course Title - Approved Arts and Humanities courses (AH) **Total AH 6 credits**
HUMA 201	Introduction to Humanities I
HUMA 211	Introduction to Humanities I Honors
HUMA 202	Introduction to Humanities II
HUMA 212	Introduction to Humanities II Honors
HUMA 301	Contemporary Humanities
ART 308	The Visual Arts
MUSC 391	The World of Music
MISC 302	Introduction to Military Training
COMM 203	Media Literacy in a Diverse World
THEA 312	Black Drama

XXXX XXX	Foreign Language 102 or higher
PHEC 300	Selected Roots of Afro-American Dance
PHIL 220	Ethics and Values
RELG 305	Introduction to World Religions

Note Well: Students must select one course from the following list of approved Social and Behavioral Science (SB) courses (See Table 4), for a total of 3 credits. This elective, in conjunction with ECON 211 (General Ed Requirements), will satisfy all 6 credits of Social and Behavioral Science requirements.

Table 4: Approved Social and Behavioral Science courses (SB)

Course #/ **3-credits each**	Course Title -Approved Behavioral Science courses (SB) **Total SB 3 credits**
HIST 101	World History I
HIST 102	World History II
HIST 111	World History I – Honors
HIST 112	World History II – Honors
HIST 105	History of the United States I
HIST 106	History of the United States II
HIST 115	History of the United States I – Honors
HIST 116	History of the United States II – Honors
ECON 212	Principles of Economics II
MHTC 103	Introduction to Group Dynamics
MISC 301	Introduction to Team and Small Unit Operations
POSC 201	American Government
POSC 206	Black Politics in America
PSYC 101	General Psychology
PSYC 111	General Psychology – Honors
SOCI 101	Introduction to Sociology
SOCI 110	Introduction to Anthropology
SOSC 101	Introduction to the Social Sciences

Group B: Math and Basic Science Requirements (19 credits)

The following table (Table 5) shows the list of Math and basic Science requirements for the electrical engineering program. You need to take these courses in the respective departments. Description of the courses may be found in the department catalogs at http://www.morgan.edu/academics/academic_catalogs.html.

Table 5: Math and Basic Science Courses-Group B

Course #	Course Title	Credit	Comments
MATH 242	Calculus II	4	Prerequisite: MATH 241
MATH 243	Calculus III	4	Prerequisite: MATH 242
MATH 340	Differential Equations	3	Prerequisite: MATH 242
MATH 331, EEGR 331, or IEGR 251	Applied Probability and Statistics	3	Prerequisite: MATH 242
PHYS 206 + PHYS 206Lab	University Physics II + Lab	5	Prerequisite: PHYS 205+Lab
Total	**Mathematics and Science Requirements**	**19**	

Group C: Electrical Engineering Core Requirements (38 credits)

The following table (Table 6) shows the list of 38 credits of the core electrical engineering courses as the main part of the requirements for the ECE program. Catalog descriptions for these courses may be found in **APPENDIX 1: ELECTRICAL AND COMPUTER ENGINEERING COURSE DESCRIPTIONS**

IMPORTANT

The prerequisite requirements will be strictly enforced. Students MUST have the prescribed prerequisites before registering for a course. Prerequisite waivers will be reviewed on a case by case basis.

Table 6: EE CORE Courses-Group C

Course #	Course name	Credit	Prerequisites	Co-requisites
EEGR 105	Introduction to Elect. & Comp. Engr.	3	MATH 106 or higher, OREN 104	
EEGR 202	Electric Circuits	4	MATH 242, PHYS 205, PHYS 205Lab	EEGR203, MATH 340, PHYS 206, PHYS 206Lab
EEGR 203	Introduction to Electrical Laboratory	1	MATH 242, PHYS 205, PHYS 205Lab	EEGR 202, MATH 340, PHYS 206, PHYS 206Lab
EEGR 211	Introduction to Digital Logic	3	EEGR 161, EEGR 202, EEGR 203	
EEGR 215	Electronic Materials & Devices	4	EEGR 161, EEGR 202, EEGR 203, MATH 242, MATH 340, PHYS 205, PHYS 205Lab, PHYS 206Lab	
EEGR 221	Signals and Systems	4	EEGR 202, EEGR 203, MATH 340	
EEGR 305	Electromagnetic Theory & Applications	4	EEGR 202, EEGR 203, MATH 243, PHYS 206+Lab	

EEGR 317	Electronic Circuits	4	EEGR 215	
EEGR 322	Discrete Systems	3	EEGR 221	
EEGR 390	Principles of Design	3	EEGR 211, EEGR 221, EEGR 317	
EEGR 400	Introduction to Professional Practice	1	EEGR 211, EEGR 221, EEGR 317	
EEGR 490	Senior Design Project I	2	EEGR 317, EEGR 390	
EEGR 491	Senior Design Project II	2	EEGR 490	
Total	Electrical Engineering Core Requirements	38		

Group D: Electrical Engineering Electives Requirements (18 credits)

The Electrical Engineering department offers a variety of elective courses (**Table 7**) which take an in-depth look at several disciplines of electrical engineering such as communication, signal processing, power, cyber security, electronics, microwave and many others. After completion of the majority of EE core requirements, you will be ready to focus on the specific area of your interest. To gain deeper knowledge in that aspect of EE, you must take 4 elective courses (12 credits) from the elective courses that are offered. These courses are always numbered as EEGR 4XX (400 level) and often referred to as senior elective courses in the department. These courses are offered periodically where the frequency of the offering is determined based on the interest from the students in the department. It is highly suggested that you plan ahead and select the elective courses that you are planning to take and discuss your plans and the timing of those courses with your academic advisor.

As part of the elective courses, you are also required to take 6 credits of relevant advanced courses offered in other departments such as Physics, Chemistry, Biology, Mathematics, Computer Science, Industrial and Civil Engineering, Business, or other relevant courses deemed appropriate for the student's program of study. Written approval must be obtained from your Faculty Advisor and the Department Chair prior to registration for approved elective courses.

Table 7: EE Electives Requirements-Group D

Course #	Course Title	Credit
EEGR 4XX	4 EE Electives	12
APPR XXX	2 Approved Electives	6
TOTAL	**Electives or Concentration Requirements**	**18**

Group E: Electrical Engineering – Computer Engineering Concentration Requirements (18 credits)

If you are interested in pursuing the EE-CE track where Computer Engineering is your concentration area, you must take *EEGR 243, and EEGR 463* to fulfill the requirements for this track (See **Table 8**). This leaves room for two other EEGR 4XX course in your curriculum. Two EEGR electives must be selected from the following: EEGR 409, EEGR 412, EEGR 415, EEGR 417, EEGR 419, and EEGR 451. In addition, EEGR-498, EEGR-499 and Engineering Graduate offerings that relate to Computer Engineering and IEGR and COSC electives will be considered on a case by case basis. ECE Department written approval is required prior to registering for any of these offerings outside of the EEGR listings. The following table shows the EE-CE concentration requirements. Remember that Group E courses replace your Group D requirements.

Table 8: EE-CE Concentration Requirements-Group E

Course #	Course Title	Credit
EEGR 243	Computer Architecture	3
EEGR 463	Digital Electronics	3
EEGR 4XX	2 ECE Electives	6
XXXX XXX	2 Approved Elective	6
TOTAL	**Electives or Concentration Requirements**	**18**

Group F: Electrical Engineering – Cyber Security Track Requirements (18 credits)

In recognition of Morgan State University's efforts in the advancement of academic program development, research, and preparing students for careers in Cyber Security, the National Security Agency (NSA) and the U.S. Department of Homeland Security (DHS) have designated Morgan State University as a National Center of Academic Excellence in Cyber Defense Education (CAE-CDE). (For more information on this designation please refer to Morgan's press release.) This designation is a very significant achievement for Morgan, and we, in the Electrical and Computer Engineering Department are proud to have led this effort in collaboration with the Computer Science and Information Science departments.

During the process of this designation an extensive set of Knowledge Units provided by the Information Assurance education experts in the NSA and DHS are mapped into five (5) ECE senior elective courses to create the Electrical Engineering Cyber Track for undergraduate students. Students who successfully complete all of the courses in this track will receive the CAE-CDE Cyber Security certificate with the NSA and DHS seals in recognition of their success in the designated Cyber track. [For more info: https://www.iotcream.com/programs/]

If you are interested in pursuing the Cyber Security track and to receive this certification, you must take *EEGR 410, EEGR 480, EEGR 481, EEGR 482, and EEGR 483* to fulfill the requirements for this track (See Table 7c). This track is compatible with the ECE curriculum and students do not have to take extra courses to receive this certificate. These courses satisfy all four Senior Elective courses (12 credits of EEGR 4xx) that are required for the electrical engineering students and one of the two non-EE elective course requirements (3 of 6 credits). The last of the two non-EE elective courses must be offered by another department such as Physics, Chemistry, Biology, Mathematics, Computer Science, Industrial and Civil Engineering, Business, or other relevant courses deemed appropriate for the student's program of study. Written approval must be obtained from your Faculty Advisor and the Department Chair prior to registration for approved elective courses. The following **Table 9** shows the Cyber Security Track requirements. *Remember that Group F courses replace your Group D requirements.*

Table 9: Cyber Security Track Requirements-Group F

Course #	Course Title	Credit
EEGR 410	Communications Networks	3
EEGR 480	Introduction to Cyber Security	3
EEGR 481	Introduction to Network Security	3
EEGR 482	Introduction to Communication Security	3

EEGR 483	Introduction to Security Management	3
XXXX XXX	1 Approved Elective	3
TOTAL	**Electives or Concentration Requirements**	**18**

F. SAMPLE PROGRAM FOR ELECTRICAL ENGINEERING STUDENTS

Table 10 shows a suggested plan of study for EE students, Table 11 shows a suggested plan for the Computer Engineering Concentration, and Table 12 shows a suggested plan of study for EE students taking the Cyber Security Track.

All three sample programs start with Calculus I (MATH241). If you are starting with a lower-level course in mathematics (pre-engineering MATH course) such as MATH 106, MATH 113, MATH 114, MATH 141, or ENGR 101, (ENGR 101 is equivalent to MATH141 for selected engineering freshmen, i.e. PACE students) you will need to see the Freshman Advisor to adjust your schedule for the first semester.

If you are starting with a lower level pre-engineering course in mathematics, it is highly suggested that you take a summer or winter mathematics class to catch up to the sample curriculum schedule shown in Table 10 .

Table 10: Sample Program for EE Students starting with MATH 241

		First Semester	Credits		Second Semester	Credits
FRESHMAN YEAR	MATH 241	CALCULUS I	4	MATH 242	CALCULUS II	4
	OREN 104	FRESHMAN ORIENTATION	1	PHYS 205	PHYS I + PHYS Lab	5
	EEGR 161	INTRO TO PROGRAMING	3	EEGR 105	INTRO TO ELEC ENGR	3
	ENGL 101	FRESHMAN COMPOSITION I	3	ENGL 102	FRESHMAN COMPOSITION II	3
	HH XXXX	HEALTH EDUCATION	3			
	TOTAL		14	TOTAL		15
SOPHOMORE YEAR	MATH 340	DIFFERENTIAL EQUATIONS	3	MATH 243	CALCULUS III	4
	PHYS 206	PHYSICS II + Lab	5	EEGR 211	INTRO TO DIGITAL LOGIC	3
	EEGR 202	ELECTRIC CIRCUITS	4	EEGR 215	ELECTRONIC MAT & DEV	4
	EEGR 203	INTRO TO ELECTRICAL LAB	1	EEGR 221	SIGNALS & SYSTEMS	4
	ECON 211	ECONOMICS (MACRO) **SB**	3			
	TOTAL		16	TOTAL		15
JUNIOR YEAR	EEGR 331	APPLIED PROB & STAT	3	EEGR 305	ELECTROMAGNETICS	4
	EEGR 317	ELECTRONIC CIRCUITS	4	EEGR 390	PRINCIPLES OF DESIGN	3
	EEGR 322	DISCRETE SYSTEMS	3	APPR XXX	APPROVED ELECTIVE	3
	APPR XXX	APPROVED ELECTIVE	3	PHIL 109	INTRODUCTION TO LOGIC	3
	HIST 350	INTRO TO BLACK DIASPORA	3	CHEM 110	GENERAL CHEMISTRY + Lab	4
	TOTAL		16	TOTAL		17
SENIOR YEAR	EEGR 400	INTRO TO PROFESSIONAL PRACTICE	1	EEGR 491	SR. DESIGN PROJECT II	2
	EEGR 490	SR. DESIGN PROJECT I	2	EEGR 4XX	ECE ELECTIVE	3
	EEGR 4XX	ECE ELECTIVE	3	EEGR 4XX	ECE ELECTIVE	3
	EEGR 4XX	ECE ELECTIVE	3	AH XXXX	ANY APPROVED AH ELECTIVE	3
	SB XXXX	ANY APPROVED SB COURSE	3	XXXX	PHYSICAL EDUCATION OR FIN 101	1
	AH XXXX	ANY APPROVED AH ELECTIVE	3			
	TOTAL		15	TOTAL		12
		STANDARD CURRICULUM			**TOTAL CREDIT HOURS**	**120**

Table 11: Sample Program for EE Students, Computer Eng. Track starting with MATH 241

	First Semester		Credits	Second Semester		Credits
FRESHMAN YEAR	MATH 241	CALCULUS I	4	MATH 242	CALCULUS II	4
	OREN 104	FRESHMAN ORIENTATION	1	PHYS 205	PHYS I + PHYS Lab	5
	EEGR 161	INTRO TO PROGRAMING	3	EEGR 105	INTRO TO ELEC ENGR	3
	ENGL 101	FRESHMAN COMPOSITION I	3	ENGL 102	FRESHMAN COMPOSITION II	3
	HH XXXX	HEALTH EDUCATION	3			
	TOTAL		14	TOTAL		15
SOPHOMORE YEAR	MATH 340	DIFFERENTIAL EQUATIONS	3	MATH 243	CALCULUS III	4
	PHYS 206	PHYSICS II + Lab	5	EEGR 211	INTRO TO DIGITAL LOGIC	3
	EEGR 202	ELECTRIC CIRCUITS	4	EEGR 215	ELECTRONIC MAT & DEV	4
	EEGR 203	INTRO TO ELECTRICAL LAB	1	EEGR 221	SIGNALS & SYSTEMS	4
	ECON 211	ECONOMICS (MACRO) **SB**	3			
	TOTAL		16	TOTAL		15
JUNIOR YEAR	EEGR 331	APPLIED PROB & STAT	3	EEGR 305	ELECTROMAGNETICS	4
	EEGR 317	ELECTRONIC CIRCUITS	4	EEGR 390	PRINCIPLES OF DESIGN	3
	EEGR 322	DISCRETE SYSTEMS	3	EEGR 463	DIGITAL ELECTRONICS	3
	EEGR 243	COMPUTER ARCHITECTURE	3	PHIL 109	INTRODUCTION TO LOGIC	3
	HIST 350	INTRO TO BLACK DIASPORA	3	CHEM 110	GENERAL CHEMISTRY + Lab	4
	TOTAL		16	TOTAL		17
SENIOR YEAR	EEGR 400	INTRO TO PROFESSIONAL PRACTICE	1	EEGR 491	SR. DESIGN PROJECT II	2
	EEGR 490	SR. DESIGN PROJECT I	2	EEGR 4XX	ECE ELECTIVE	3
	EEGR 4XX	ECE ELECTIVE	3	APPR XXX	APPROVED ELECTIVE	3
	APPR XXX	APPROVED ELECTIVE	3	AH XXXX	ANY APPROVED AH ELECTIVE	3
	SB XXXX	ANY APPROVED SB COURSE	3	XXXX	PHYSICAL EDUCATION OR FIN 101	1
	AH XXXX	ANY APPROVED AH ELECTIVE	3			
	TOTAL		15	TOTAL		12
		COMPUTER ENG.			**TOTAL CREDIT HOURS**	**120**

Table 12: Sample Program for EE Students, Cyber Security Track starting with MATH 241

		First Semester	Credits		Second Semester	Credits
FRESHMAN YEAR	MATH 241	CALCULUS I	4	MATH 242	CALCULUS II	4
	OREN 104	FRESHMAN ORIENTATION	1	PHYS 205	PHYS I + PHYS Lab	5
	EEGR 161	INTRO TO PROGRAMING	3	EEGR 105	INTRO TO ELEC ENGR	3
	ENGL 101	FRESHMAN COMPOSITION I	3	ENGL 102	FRESHMAN COMPOSITION II	3
	HH XXXX	HEALTH EDUCATION	3			
	TOTAL		14	TOTAL		15
SOPHOMORE YEAR	MATH 340	DIFFERENTIAL EQUATIONS	3	MATH 243	CALCULUS III	4
	PHYS 206	PHYSICS II + Lab	5	EEGR 211	INTRO TO DIGITAL LOGIC	3
	EEGR 202	ELECTRIC CIRCUITS	4	EEGR 215	ELECTRONIC MAT & DEV	4
	EEGR 203	INTRO TO ELECTRICAL LAB	1	EEGR 221	SIGNALS & SYSTEMS	4
	ECON 211	ECONOMICS (MACRO) **SB**	3			
	TOTAL		16	TOTAL		15
JUNIOR YEAR	EEGR 331	APPLIED PROB & STAT	3	EEGR 305	ELECTROMAGNETICS	4
	EEGR 317	ELECTRONIC CIRCUITS	4	EEGR 390	PRINCIPLES OF DESIGN	3
	EEGR 322	DISCRETE SYSTEMS	3	APPR XXX	APPROVED ELECTIVE	3
	APPR XXX	APPROVED ELECTIVE	3	PHIL 109	INTRODUCTION TO LOGIC	3
	HIST 350	INTRO TO BLACK DIASPORA	3	CHEM 110	GENERAL CHEMISTRY + Lab	4
	TOTAL		16	TOTAL		17
SENIOR YEAR	EEGR 400	INTRO TO PROFESSIONAL PRACTICE	1	EEGR 491	SR. DESIGN PROJECT II	2
	EEGR 490	SR. DESIGN PROJECT I	2	EEGR 482	INTRO TO CRYPTOGRAPHY	3
	EEGR 410	INTRO TO NETWORKS	3	EEGR 481	INTRO TO NETWORK SECURITY	3
	EEGR 480	INTRO TO CYBER SECURITY	3	AH XXXX	ANY APPROVED AH ELECTIVE	3
	EEGR 483	INTRO TO SECURITY MANAGEMENT	3	XXXX	PHYSICAL EDUCATION OR FIN 101	1
	SB XXXX	ANY APPROVED SB COURSE	3			
	TOTAL		15	TOTAL		12
		CYBER-SECURITY			**TOTAL CREDIT HOURS**	**120**

G. ELECTRICAL ENGINEERING CURRICULA SEQUENCE FLOWCHARTs

For a sequence of course for the Electrical Engineering, Computer Engineering, and Cyber Security curricula sequences, go to Appendix A.

H. SUGGESTED COURSE SELECTION FOR FIRST TIME FRESHMEN BELOW MATH 241 (FIRST SEMESTER)

The following tables are the sequences of preparatory (pre-engineering) math courses if starting with MATH 106, MATH 113, MATH 114, MATH 141, or ENGR 101 (ENGR 101 is equivalent to MATH141 for selected engineering freshmen, i.e. PACE students). It should be emphasized that the final schedule must be approved by the assigned freshmen advisors or the Chair of the Department of Electrical and Computer Engineering.

Table 13: First Semester Suggested Course Selections

Fundamentals of Mathematics Entry (MATH 106)		
Course #	Course name	Credit
OREN 104	FRESHMAN ORIENTATION	1
MATH 106	FUNDAMENTALS OF MATH	3
ENGL 101	FRESHMAN COMPOSITION I	3
HEED 103	HEALTH EDUCATION	3
HIST 101	HISTORY	3
PHEC XXX	PHYSICAL EDUCATION	1
TOTAL		**14**

Math Analysis Entry (MATH 113)		
Course #	Course name	Credit
OREN 104	FRESHMAN ORIENTATION	1
MATH 113	MATH ANALYSIS I or	4
ENGL 101	FRESHMAN COMPOSITION I	3
HEED 103	HEALTH EDUCATION	3
HIST 101	HISTORY	3
PHEC XXX	PHYSICAL EDUCATION	1
TOTAL		**15**

Pre-Calculus Entry (MATH 141)		
Course #	Course name	Credit
OREN 104	FRESHMAN ORIENTATION	1
MATH 141	PRE-CALCULUS	4
ENGL 101	FRESHMAN COMPOSITION I	3
EEGR 161	INTRO TO C PROGRAMING	3
HEED 103	HEALTH EDUCATION	3
PHEC XXX	PHYSICAL EDUCATION	1
TOTAL		**15**

Calculus- Ready (MATH 241)		
Course #	Course name	Credit
OREN 104	FRESHMAN ORIENTATION	1
MATH 241	CALCULUS I	4
ENGL 101	FRESHMAN COMPOSITION I	3
EEGR 161	INTRO TO C PROGRAMING	3
HEED 103	HEALTH EDUCATION	3
PHEC XXX	PHYSICAL EDUCATION	1
TOTAL		**15**

Based on the placement test score cards, if you need to take DVRD 101 (Developmental Reading), replace HEED 103 with DVRD 101 (2 credits).

Based on the placement test score cards if you need to take ENGL 101 Freshmen Studies, make sure that you sign up for a course with FS (Freshman Studies) section number.

I. BS/ME DEGREE IN ENGINEERING

The B.S./M.E. and the B.S./M.S. degree programs enables exceptionally qualified students and highly motivated undergraduates majoring in Engineering to obtain both a bachelor's and master's degree in a minimum of five years. The B.S./M.E. or the B.S./M.S. program in Engineering is applicable to the bachelor's and master's degrees in electrical engineering. The goal of the Undergraduate to the Graduate program is to accelerate the production of electrical engineering professionals who are capable of entering into the technology workforce and making significant contributions to society, while safeguarding the environment.

The number of undergraduate electives in the major may be reduced for B.S./M.E. candidates, thereby enabling them to begin graduate courses once they have met their general education requirements and the majority of the requirements in their majors. After completing their senior year, all subsequent course work is at the graduate level. Graduate credits may be accepted in fulfillment of some undergraduate requirements; graduate credits used to satisfy undergraduate requirements may not be used again to satisfy graduate requirements.

Admission Criteria

The Bachelor to the Masters (M.E. or M.S.) program in Engineering allows students to begin graduate study (concurrent with undergraduate work) in the second semester of their junior year. For admission to the B.S./M.E. program in Engineering, an applicant must have completed 85 credits and must have completed EEGR 317 and EEGR 322. A candidate for admission to the Bachelor to Masters program must have a minimum cumulative grade point average of 3.3 at the end of the sophomore year and must maintain this average in order to remain in the program. Upon admission to the B.S./M.E. program students must maintain a cumulative grade point average of 3.3 each semester or they will be dismissed from the B.S./M.E. program and thereafter be only eligible to receive the bachelor's degree.

This is the minimum requirement for consideration; it does not guarantee admission or retention. Candidates must submit written recommendations from the chairperson of the department in which they are matriculating and from one faculty member, who will serve as an advisor. Applicants must also provide a typed statement indicating why they seek to enter the program, and a sample that is representative of their technical work. Acceptance into the program is determined by a B.S./M.E. Committee comprised of representatives from the department of electrical and computer engineering. The application package is submitted to the School of Graduate Studies.

General Requirements: B.S./M.E.

Students for the B.S./M.E. program will be required to complete the B.S. degree requirements of their respective discipline and a total of 33 acceptable credit hours of graduate coursework inclusive of 2 credit hours of seminar and 4 credit hours of Project Report. Successful completion and oral defense of the Report Project is required in lieu of taking a comprehensive examination. For more information, see:

https://www2.morgan.edu/school_of_engineering/departments/electrical_and_computer_engineering/graduate_program/masters_programs/bachelor_of_science_to_master_of_engineering.html

General Requirements: B.S./M.S.

Students for the B.S./M.S program will be required to complete the B.S. degree requirements and the M.S. degree requirements for electrical engineering. Up to six credits of graduate coursework may count towards the undergraduate

degree. For the M.S., the thesis option requires 24 credits and two thesis courses (29 credits). For more information see:

https://www2.morgan.edu/school_of_engineering/departments/electrical_and_computer_engineering/graduate_program/masters_programs/bachelor_of_science_to_master_of_science.html

Degrees Received

Upon satisfying both the undergraduate and masters requirements for degree completion, students receive both the Bachelor of Science and the Master of Engineering or Master of Science degrees. A student may elect to receive only a B.S. degree by taking EEGR 491, however, the student is no longer eligible for the B.S./M.E. program. In order to receive a Master's Degree at Morgan State University, the student will then have to apply to the traditional two-year program.

Table 14: Bachelor of Science / Master of Science, Electrical Engineering Suggested Curriculum Sequence

		First Semester	Credits		Second Semester	Credits
FRESHMAN YEAR	MATH 241	CALCULUS I	4	MATH 242	CALCULUS II	4
	OREN 104	FRESHMAN ORIENTATION	1	PHYS 205	PHYS I + PHYS Lab	5
	EEGR 161	INTRO TO PROGRAMING	3	EEGR 105	INTRO TO ELEC ENGR	3
	ENGL 101	FRESHMAN COMPOSITION I	3	ENGL 102	FRESHMAN COMPOSITION II	3
	HH XXXX	HEALTH EDUCATION	3			
	TOTAL		**14**	**TOTAL**		**15**
SOPHOMORE YEAR	MATH 340	DIFFERENTIAL EQUATIONS	3	MATH 243	CALCULUS III	4
	PHYS 206	PHYSICS II + Lab	5	EEGR 211	INTRO TO DIGITAL LOGIC	3
	EEGR 202	ELECTRIC CIRCUITS	4	EEGR 215	ELECTRONIC MAT & DEV	4
	EEGR 203	INTRO TO ELECTRICAL LAB	1	EEGR 221	SIGNALS & SYSTEMS	4
	ECON 211	ECONOMICS (MACRO) **SB**	3	SB XXXX	ANY APPROVED SB COURSE	3
	TOTAL		**16**	**TOTAL**		**18**
JUNIOR YEAR	EEGR 331	APPLIED PROB & STAT	3	EEGR 305	ELECTROMAGNETICS	4
	EEGR 317	ELECTRONIC CIRCUITS	4	EEGR 390	PRINCIPLES OF DESIGN	3
	EEGR 322	DISCRETE SYSTEMS	3	APPR XXX	APPROVED ELECTIVE	3
	APPR XXX	APPROVED ELECTIVE	3	PHIL 109	INTRODUCTION TO LOGIC	3
	HIST 350	INTRO TO BLACK DIASPORA	3	CHEM 110	GENERAL CHEMISTRY + Lab	4
	TOTAL		**16**	**TOTAL**		**17**
	EEGR 400	INTRO TO PROFESSIONAL PRACTICE	1	EEGR 490	SR. DESIGN PROJECT I	2

SENIOR YEAR	EEGR 4XX	ECE ELECTIVE	3		EEGR 4XX	ECE ELECTIVE	3
	EEGR 4XX	ECE ELECTIVE	3		AH XXXX	ANY APPROVED AH ELECTIVE	3
	EEGR 4XX	ECE ELECTIVE	3		XXXX	PHYSICAL EDUCATION OR FIN 101	1
	AH XXXX	ANY APPROVED AH ELECTIVE	3		**XXX**	**GRADUATE ELECTIVE**	3
	EEGR XXX	**CORE - VARIES BY CONCENTRATION**	3		**XXX**	**GRADUATE ELECTIVE**	**3**
	TOTAL		**16**		**TOTAL**		**15**
SENIOR YEAR /GRADUATE	EEGR XXX	CORE - VARIES BY CONCENTRATION	3		EEGR 795/ EEGR 799	SCHOLARLY PROJECT/ THESIS DEFENCE	3
	EEGR XXX	CORE - VARIES BY CONCENTRATION	3		XXX	GRADUATE ELECTIVE	3
	XXX	GRADUATE ELECTIVE	3		XXX	GRADUATE ELECTIVE	3
	XXX	GRADUATE ELECTIVE	3				
	TOTAL		**12**		**TOTAL**		**9**
		BS/MS - ELECTRICAL ENG				**TOTAL CREDIT HOURS**	**148**

J. EXPECTATIONS FOR EACH STUDENT

As a student in the Department of Electrical and Computer Engineering, you are expected to conduct yourself accordingly, exhibiting a standard of professionalism and engineering ethics, which is representative of the Department and School. You are expected to show respect for your faculty, attend all of your classes, be on time and do your assignments in a professional and ethical manner.

It is important that you also adhere to course prerequisites. Do not rely only on the computer to determine prerequisites, but rather use your catalog and handbook for assistance, and verify with your advisor. Unsatisfactory grades in courses should be repeated immediately. ***Note:*** *The School of Engineering does not award the D grade in its courses. These are courses beginning in "EEGR," CEGR," and "IEGR." Only grades of A, B, C, and F will be awarded.*

If you receive an F in an elective course in the major, you have the following options:

1. Retake the course and pass with a C or better
2. Substitute an equivalent course and pass with a C or better.

If you decide to take option 2 by substituting an equivalent course, the F grade for the original course will remain on your transcript and will be computed into your GPA. You will have only one opportunity to substitute an equivalent course for a course you have previously failed.

K. IMPORTANT UNIVERSITY POLICIES

IEEE CODE OF ETHICS

The Department of Electrical and Computer Engineering has determined that is important for students to know and follow a code of ethics specific to the profession-The Institute of Electronic and Electrical Engineers (IEEE). The organization's code of ethics can be found using the following weblink:

https://www.ieee.org/about/corporate/governance/p7-8.html

ACADEMIC INTEGRITY

Morgan State University upholds Academic Integrity within the collegiate environment. It is the responsibility of both faculty and student to 'uphold intellectual honesty in the pursuit of knowledge', as noted in the following weblink:

https://www.morgan.edu/Documents/ADMINISTRATION/Regents/policies/A-1_Academic_Integrity.pdf

ACADEMIC DISHONESTY POLICY

In addition, faculty at Morgan State University is responsible for promoting honest academic conduct among students and the Academic Dishonesty Policy is noted in the following weblink:

http://catalog.morgan.edu/content.php?catoid=3&navoid=188#policy-on-academic-dishonesty

MSU STUDENT CODE OF CONDUCT

Morgan State University has established a Code of Conduct that students must follow. The code of conduct in its entirety is provided on the following weblink:

https://www.morgan.edu/Documents/ADMINISTRATION/Regents/policies/bor_CodeofStudentConduct_r1.pdf

Students within the Department of Electrical and Computer Engineering are expected to have a high standard of behavior inside and outside of the classroom. Any student misconduct is subject to disciplinary actions. Prohibited conduct is noted below:

1. Disruptive, disorderly or reckless conduct
    a. Disruption in the Classroom: The primary responsibility for managing the teaching and learning environment rests with the instructor, which includes faculty, teaching assistants, laboratory assistants, librarians or any other person acting in a supervisory capacity over the instructional forum. Students who engage in unlawful or prohibited conduct in those forums which includes any behavior prohibited by the instructor (including but not limited to use of cellular phones, bringing unregistered persons to class, smoking, persistently speaking without being called upon, refusing to be seated, disrupting the class by leaving and entering without authorization, etc.), **may be directed by the instructor to leave the class for the remainder of the class period.** Depending on the severity and frequency of the conduct, the University may impose any other sanction available to it at law.
    b. Engaging in disorderly or disruptive conduct, which interferes with the activities of others.
    c. Stalking - means engaging in a course of conduct directed at a specific person that would cause a reasonable person to fear for his or her safety or the safety of others, or suffer substantial emotional distress.
    d. Abuse of any person; this includes verbal, written, electronic, or telephone abuse.
    e. Harassment of any person which is defined as unwelcome conduct (including written or electronic communication) directed at a specific person(s), which is so severe, pervasive or persistent that it interferes with or limits a person's ability to participate in, or benefit from the services, activities, or opportunities offered by the University.
2. False Information
    a. Intentionally furnishing or causing false information or a false report to be furnished to the University.
    b. Making, possessing, or using any forged, altered, or falsified instrument of identification.

SCHOOL OF ENGINEERING ACADEMIC DISHONESTY POLICY

Academic dishonesty is not valued in the School of Engineering. Under no circumstance(s) shall a student represent the original words or ideas of others as your own. If any words or ideas used in a class posting or assignment submission do not represent your original words or ideas, then the student committed academic fraud. Therefore, all students are expected to conform to all University standards of conduct in accordance with the Policy on Academic Dishonesty as per the University Catalog. All work presented on examinations and assignments must be of your own

electronic devices (i.e., phones, tablets, laptops, MacBooks, etc.) will not be allowed for use on any quiz or exam. Any deviation from this policy will be regarded as **academic dishonesty**[1], including but not limited ***to cheating, bribery, misrepresentation, conspiracy, fabrication, collusion, duplicate submission, academic misconduct, improper computer/calculator use, improper online/hybrid course use, disruptive behavior, plagiarism, deception, and professional misconduct***[2] . Consequently, the student will receive an "F" for the exam, assignment and/or final grade as deemed appropriate for any act(s) of academic dishonesty. The student has the right to appeal the action taken by submitting in writing to the School of Engineering Judicial Committee to request a hearing on the academic fraud allegation(s) within the same semester by emailing soesss@morgan.edu.

L. MSU Online Forms

Online forms can be accessed directly from the Office of the Registrar's portal include here:

Online Forms

Access many forms including these:

a. Change of Catalog Request Form
b. Change of Major/Minor Request Form
c. Enrollment/Degree Verification Request Form
d. Excess Credit Request Form
e. Time Conflict Request Form
f. Withdrawal Request Form

[1] (https://spcollege.libguides.com/c.php?g=254383&p=1695452#cheating)

[2] https://en.wikipedia.org/wiki/Academic_dishonesty

M. Appendices:

a. Flowcharts for Electrical and Computer Engineering Curricula Sequences
b. Electrical and Computer Engineering Course Descriptions
c. Faculty Research Interest
d. Faculty/Staff Contact Information

Appendix A: Flowcharts For Electrical and Computer Engineering Curricula Sequences

The flowcharts below (Figures 1, 2, and 3) show the sequences of courses in the EE curriculum for students who have entered our department on or after Fall 2013. Solid lines represent a prerequisite relationship and dotted lines represent co-requisite course relations.

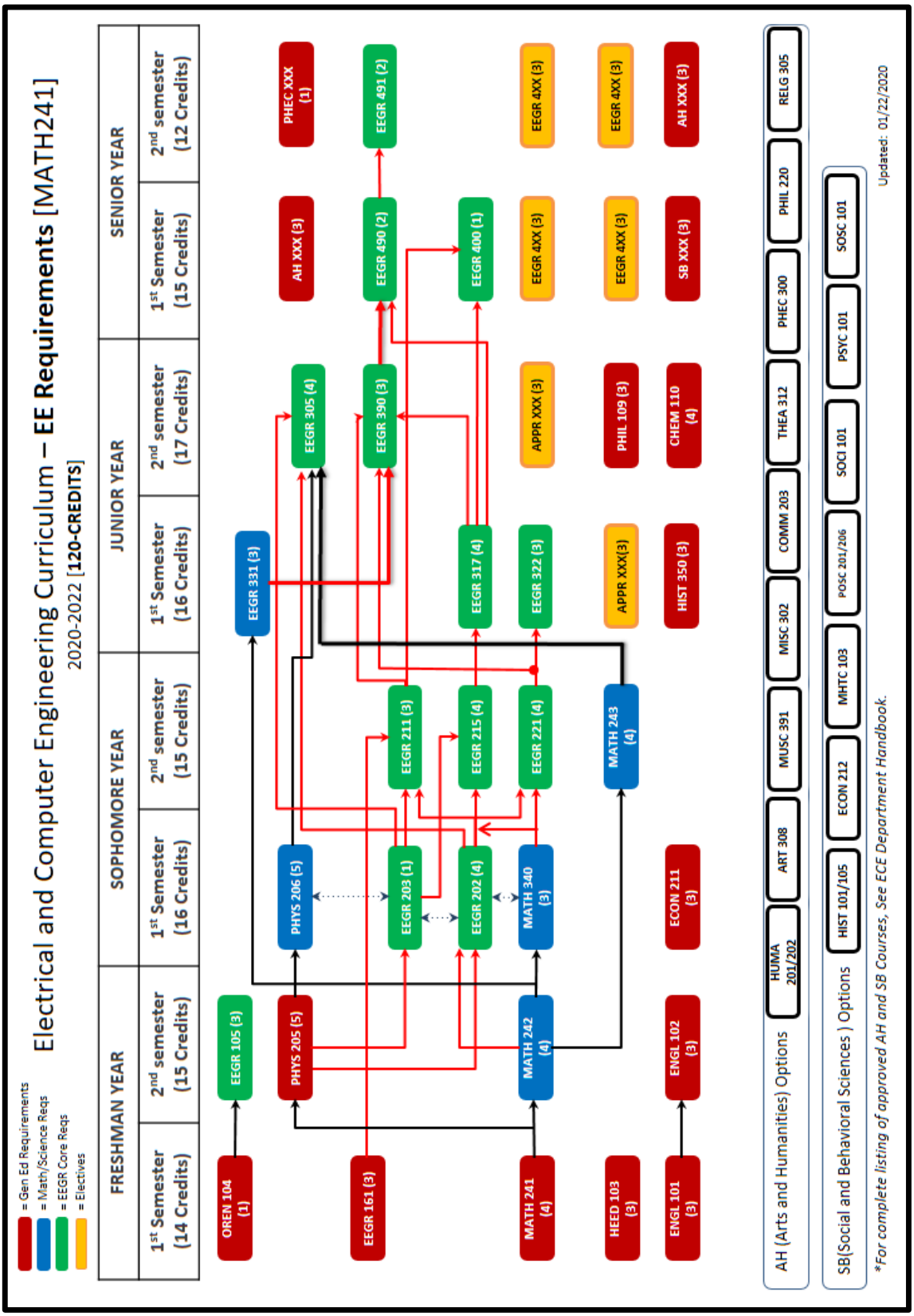

Figure 1: Curriculum Sequence Flowchart – Standard EE Requirements (MATH 241)

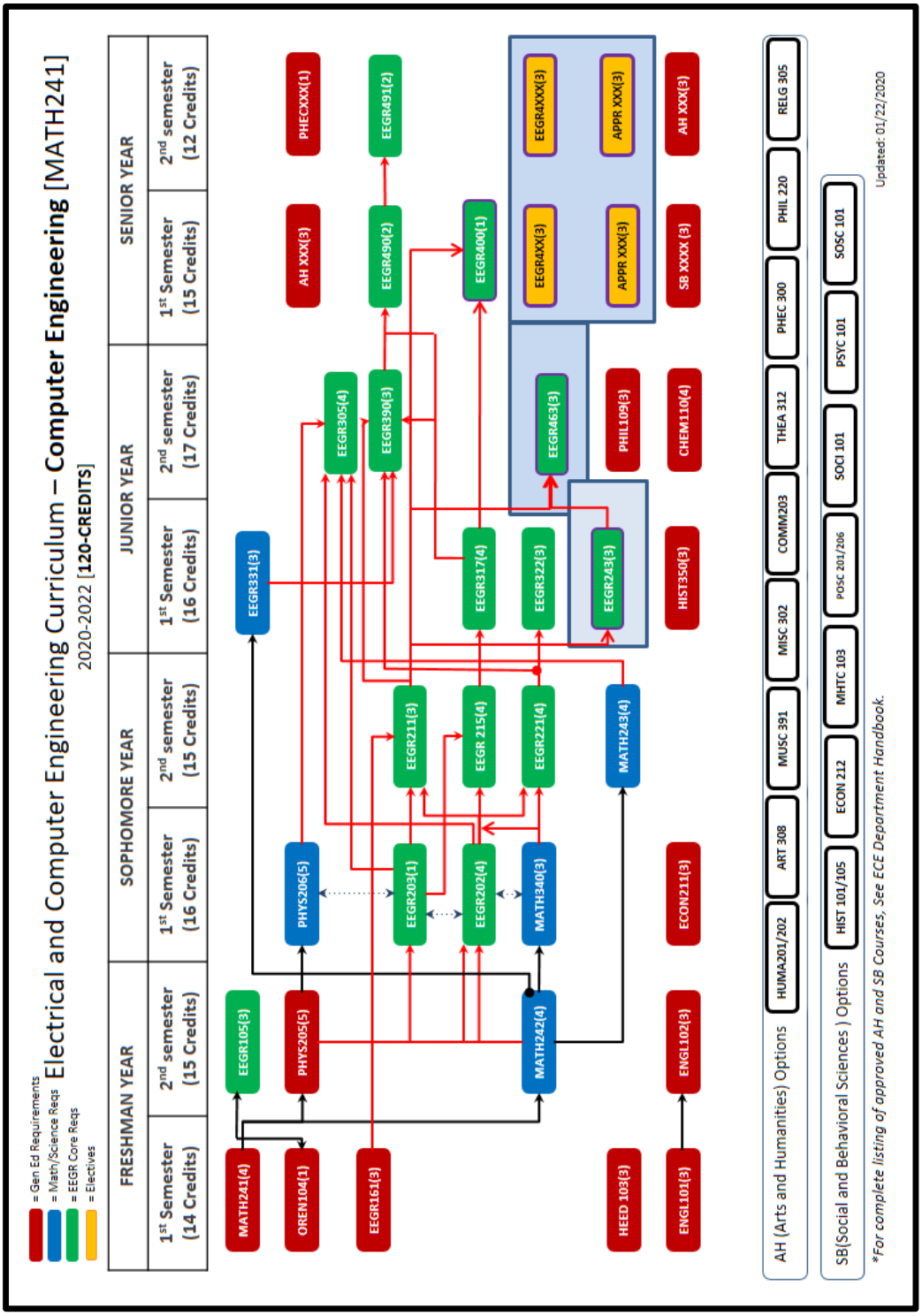

Figure 2: Curriculum Sequence Flowchart – Computer Engineering Track Requirements (MATH 241)

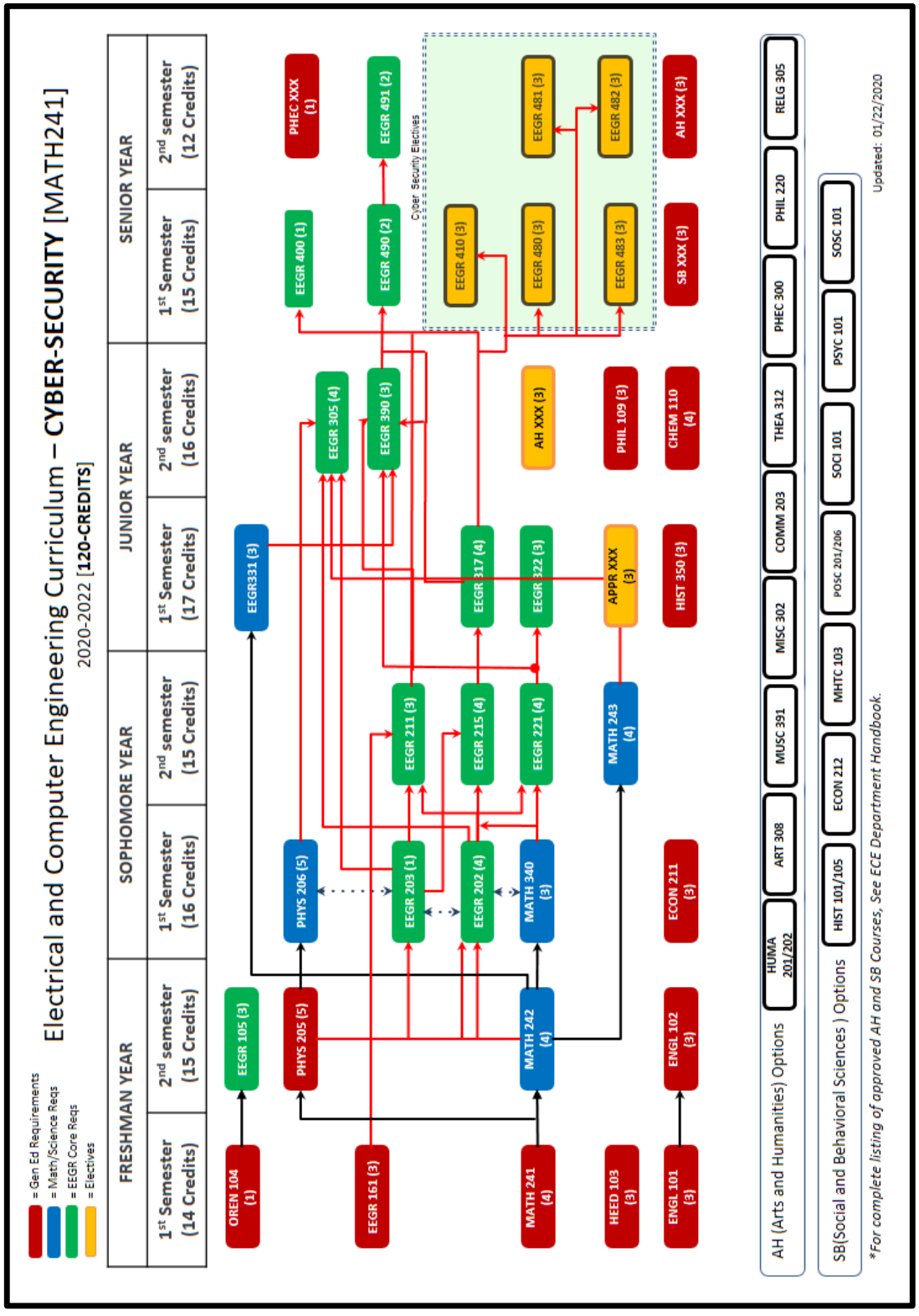

Figure 3: Curriculum Sequence Flowchart – Computer Engineering Track Requirements (MATH 241)

Appendix B: Electrical and Computer Engineering Course Descriptions

IMPORTANT

The prerequisite requirements will be strictly enforced. Students MUST have the prescribed prerequisites before registering for a course. Prerequisite waivers will be reviewed on a case by case basis.

OREN 104 FRESHMAN ORIENTATION FOR ENGINEERING MAJORS

Two hours lecture; 1 credit.

This course is designed to prepare students for the rigors of earning an engineering degree. It introduces students to the expectation and demands of higher education, to the legacy and traditions of Morgan State University, to college success strategies, and to the broad array of career opportunities in the fields of engineering. Students enrolled in this class are required to attend selected university convocations, School of Engineering programs, and other prescribed activities. They are also required to hold conferences with their faculty advisors. Students transferring 24 or more credits to the University when admitted are exempt from this requirement. Formerly ORIE 104 (FALL/SPRING).

ENGR 101 FUNDAMENTALS OF ENGINEERING I

Four hours lecture, one hour laboratory; 4 credits.

This course is designed to provide students with the analytical and problem solving skills needed as a foundation to enter into Calculus I (MATH 241), Introduction to Probability (MATH 120), and/or Finite Mathematics (MATH 118). Math concepts at the pre-calculus level (MATH 141) are accompanied by a contemporary engineering problem lab. ENGR 101 is considered to be equivalent to MATH 141. **Prerequisite:** MATH 113 or higher placement score or special permission from the program chair. (FALL/SPRING). Students must pass with a grade of "C" or better.

EEGR 105 INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING

Three hours lecture; one hour lab. 3 credits.

Introduction to the profession. Ethics and professional behavior. Students are exposed to various specialties and areas which may include an introduction to the computer, programming and computational tools; digital design; communications; laboratory instrumentation; introduction to probability and statistics and other general topics. **Prerequisites:** OREN 104 and ENGR101 or MATH 106 or better. Students must pass each class with a grade of "C" or better.

EEGR 161 INTRODUCTION TO PROGRAMMING

Three hours lecture; 3 credits.

Topics include computer components, algorithm design with flowcharts and pseudo-code; algorithm implementation in the programming language. Students will apply programming, documentation, debugging/ testing techniques to problem solving and data analysis. The course will include the selection and application of library programs and routines with application to engineering. **Prerequisite:** MATH 113 or better; or ENGR 101. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 202 ELECTRIC CIRCUITS

Four hours lecture; 4 credits.

Includes Ohm's and Kirchhoff's laws; VI laws of RLC elements, Analysis techniques including Thevenin's and Norton's Theorem; Phasor concepts, Two-port and magnetically coupled networks. **Prerequisites:** MATH 242, and PHYS 205/ PHYS 205LAB. **Co-requisites:** EEGR 203, MATH 340, and PHYS 206/PHYS 206LAB. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 203 INTRODUCTION TO ELECTRICAL LABORATORY

One hour lecture, three hours laboratory; 1 credit.

Involves report writing and the use of laboratory instruments and experiments relative to Kirchhoff's laws, circuit linearity, transient response, and operational amplifiers. **Prerequisites:** MATH 242, PHYS 205/PHYS 205LAB. **Co-requisite:** EEGR 202, MATH 340, and PHYS 206/PHYS 206LAB. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 211 INTRODUCTION TO DIGITAL LOGIC

Three hours lecture, one hour laboratory; 3 credits.

Covers number systems, Boolean algebra, logic functions and gates, minimization techniques, decoders, encoders, multiplexers, arithmetic circuits, latches, flip-flops, counters, and shift registers. Laboratory section includes design and implementation of combinatorial and sequential circuits. **Prerequisites:** EEGR 161, EEGR 202, and EEGR 203. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 215 ELECTRONIC MATERIALS AND DEVICES

Four hours lecture, one hour laboratory; 4 credits.

Includes semiconductor physics, PN-junction transistors, junction field effect transistors, metal oxide FETs. Laboratory consists of experiments related to the analysis and design of circuits employing diodes, transistors and integrated circuits. **Prerequisites:** MATH 242, MATH 340, PHYS 206/PHYS 206 LAB, EEGR 161, EEGR 202 and EEGR 203. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 221 SIGNALS AND SYSTEMS

Four hours lecture; 4 credits.

Includes manipulation of continuous signals; singularity functions, differential equations and continuous convolution; Fourier series and transforms; Complex frequency; Laplace transform, state variables; Frequency analysis. **Prerequisites:** MATH 340 and EEGR 202 and EEGR 203. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 243 COMPUTER ARCHITECTURE

Three hours lecture, one hour laboratory; 3 credits.

Examines the basic principles and techniques used in the design and evaluation of computer systems. Includes assembly language programming techniques, data path and control design of computers, and computer performance relative to computer design. Stresses the principle design concepts that are embodied in modern computer architectures. **Prerequisites:** EEGR 202, EEGR 203, EEGR 211, and EEGR 161. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 305 ELECTROMAGNETIC THEORY AND APPLICATIONS

Four hours lecture; 4 credits.

This course introduces the student to the principles and applications of electromagnetics. Topics include: review of vector calculus, electric and magnetic fields, Maxwell's equations in integral and differential form, Poisson's equation, Laplace's equation, uniform plane waves, transmission lines and waveguides. **Prerequisites:** MATH 243, PHYS 206/PHYS206LAB, EEGR 202 and EEGR 203. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 310 PRINCIPLES OF ELECTRONICS

Three hours lecture; 3 credits.

Presents the fundamental principles of electronic devices, circuits, and digital systems. **Closed to Electrical Engineering Majors. Pre- requisites:** MATH 340 and PHYS 206/PHYS206LAB. (FALL/ SPRING). Students must pass each class with a grade of "C" or better.

EEGR 317 ELECTRONIC CIRCUITS

Four hours lecture, one hour laboratory; 4 credits.

Analysis and design of electronic circuits employing diodes and active components such as Bipolar Transistors, FETs and Op- Amps. Includes an applications-oriented design laboratory. **Prerequisite:** EEGR 215. (FALL/SPRING). Students must pass EEGR 215 with a grade of "C" or better.

EEGR 322 DISCRETE SYSTEMS

Three hours lecture; 3 credits.

Manipulation of discrete signals, Fourier analysis of discrete signals, z-transform, Discrete Fourier Transform, Fast Fourier Transform, Digital filter design, state variables. **Prerequisite:** EEGR 221. (FALL/ SPRING). Students must pass EEGR 221 with a grade of "C" or better.

EEGR 331 APPLIED PROBABILITY AND STATISTICS FOR ELECTRICAL ENGINEERS

Three hours lecture; 3 credits.

This course introduces the principles of probability and statistics to undergraduate electrical engineering students. Consists of probability concepts including fundamentals of probability, events, conditional probability, discrete and continuous random variables, probability density functions and distribution functions, and applied statistics, along with practical EE examples and applications. **Prerequisites:** MATH 242 and EEGR 202. (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 390 PRINCIPLES OF DESIGN

Three hours lecture, three hours laboratory; 3 credits.

Applies design principles and methods to analog and digital circuits. Students will work in teams to design small systems as solutions to given engineering

problems, based on system engineering and product development approaches. **Prerequisites:** EEGR 211, EEGR 221 and EEGR 317, EEGR 322, EEGR 331. (FALL/ SPRING). Students must pass each class with a grade of "C" or better.

EEGR 400 INTRODUCTION TO PROFESSIONAL PRACTICE

One hour lecture; 1 credit.

Discusses the role of the engineer in the larger world, professional ethics and behavior, and techniques for a rewarding career and life, emphasizing lifelong learning. **Prerequisites:** EEGR 211, EEGR 221, and EEGR 317. **This course must be taken one semester prior to the student's final semester.** (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 409 C PROGRAMMING APPLICATIONS

Three hours lecture, one hour laboratory; 3 credits.

Data types, operators and expressions, structures, 3pointers, arrays and complex data structures. Program documentation, development tools and administration of large software development. **Prerequisites:** EEGR 211, EEGR 215, EEGR 221, and EEGR 161 (or its equivalent). (FALL). Students must pass each class with a grade of "C" or better.

EEGR 410 INTRODUCTION TO NETWORKS

Three hours lecture; 3 credits.

An introduction to communication networks. Includes the OSI layering model of networks with emphasis on the physical, data link, and network layers; and network topologies. Introduction to a variety of computer, satellite, and local-area communication networks, including Ethernet and Internet. **Prerequisite:** EEGR 317 (FALL). Students must pass each class with a grade of "C" or better.

EEGR 412 COMPUTER ORGANIZATION

Three hours lecture, two hours laboratory; 3 credits.

Consists of computer organization, machine and assembly language programming techniques, interfacing, schema, microprogramming concepts, advanced systems utilization, and project design. **Prerequisites:** EEGR 211 and EEGR 243. (SPRING). Students must pass each class with a grade of "C" or better.

EEGR 415 JAVA PROGRAMMING FOR ENGINEERS

Three hour lecture, one hour laboratory; 3 credits.

This course introduces fundamental structured and object-oriented programming concepts and techniques, using Java. Topics covered include variables, arithmetic operators, control structures, arrays, functions, recursion, dynamic memory allocation, files, class usage and class writing. Projects may include material related to cyber security, automated guidance, data acquisition, and analytics etc. In addition, this course will discuss aspects of program documentation, industry standard development tools, and the process of administering large software development projects. This course will include hands-on instructions on tools necessary for Java programming in a Microsoft Windows and Mac OS environment as well as discussing general programming/testing/debugging techniques and discussing common problems. Prerequisites: EEGR 215, EEGR 221, and EEGR 161 (SPRING). Students must pass each class with a grade of "C" or better.

EEGR 417 MICROPROCESSORS APPLICATIONS

Three hours lecture, one hour laboratory; 3 credits.

Provides an overview of microprocessors and peripherals. Teaches use of basic tools and confidence to evaluate the suitability of microcomputer technology applied to engineering problems and to effectively design microcomputer software and hardware to satisfy a variety of needs. **Prerequisites:** EEGR 211,-EEGR 243 and EEGR 409. (FALL). Students must pass each class with a grade of "C" or better.

EEGR 418 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Three hours lecture/ laboratory; 3 credits.

This course provides a survey of the theory with practical applications of Artificial Intelligence via the study and use of Neural Networks, Natural Language Processing, Deep Learning, Machine Learning and other prominent technology. Code used will be written in Python and other languages as well, e.g. C/C++/ Cloud services via Google/Amazon/Microsoft will be used for implementing projects and GitHub for software version control. **Prerequisite: EEGR 211, EEGR 215 AND EEGR 161**. (OFFERED AS NEEDED). Students must pass each class with a grade of "C" or better.

EEGR 419 INSTRUMENTATION CONTROL AND SENSORS

Three hours lecture, one hour laboratory; 3

credits.

Design of processor based systems to interface with real world peripherals for control and measurement and data acquisition. Includes interfacing of inputs, output drivers, isolation, digital to analog, and analog to digital conversion and such protocols as the Philips 12C, Motorola SPI, Dallas 1-wire and asynchronous serial RS232. **Prerequisites:** EEGR 409 and EEGR 317. (SPRING). Students must pass each class with a grade of "C" or better.

EEGR 424 ELEMENTS OF POWER SYSTEM ANALYSIS

Three hours lecture; 3 credits.

Treats system network equations, load flow computations, and symmetrical and asymmetrical faults. Swing equation. **Prerequisite:** EEGR 202. (OFFERED AS NEEDED). Students must pass EEGR 202 with a grade of "C" or better.

EEGR 431 LINEAR CONTROL SYSTEMS

Three hours lecture; 3 credits.

Analysis of time and frequency response of closed loop systems, Routh-Hurwitz and Nyquist criteria for stability, root-locus method, and system specifications. **Prerequisite:** EEGR 221. (FALL). Students must pass each class with a grade of "C" or better.

EEGR 440 INDUSTRIAL EXPERIENCE

Nine hours; 3 credits.

Credit awarded based on faculty evaluation of work performed by students in the Cooperative Education Program. Departmental approval before registration.

EEGR 443 INTRODUCTION TO MICROWAVES

Three hours lecture; 3 credits.

Deals with wave types, transmission lines and waveguides. Smith chart, S-parameters, active and passive components, and measurement techniques: **Prerequisite:** EEGR 202, EEGR 203, EEGR 215, and EEGR317. (FALL). Students must pass each class with a grade of "C" or better.

EEGR 444 SPECIALIZED TOPICS IN MICROWAVES

Three hours lecture; 3 credits.

Specialized topics and design relating to high frequency devices, circuits and systems. **Prerequisite:** EEGR 202, EEGR 203, EEGR 215, EEGR 305, EEGR317, and EEGR 443. (AS NEEDED). Students must pass EEGR 443 with a grade of "C" or better.

EEGR 451 DIGITAL SIGNAL PROCESSING

Three hours lecture; two hours laboratory; 3 credits.

Covers discrete Fourier Transform, Fast Fourier Transform, Sampling, Quantization, Digital filter design. Emphasis is placed on the applications of digital signal processing. **Prerequisite:** EEGR 322. (SPRING). Students must pass EEGR 322 with a grade of "C" or better.

EEGR 453 COMMUNICATIONS THEORY

Three hours lecture; 3 credits.

Includes probability theory, analog and digital modulation techniques, noise in modulating systems, digital data transmission, optimum receivers. **Prerequisite:** EEGR 322 and EEGR 331. (FALL). Students must pass each class with a grade of "C" or better.

EEGR 454 COMMUNICATIONS ELECTRONICS

Three hours lecture, one hour laboratory; 3 credits.

Covers spectrum and noise measurements, design of AM and ASK detectors, FM and FSK modulators, and phase lock loops. **Prerequisites:** EEGR 317 and EEGR 453. (OFFERED AS NEEDED). Students must pass each class with a grade of "C" or better.

EEGR 460 ELECTRO-OPTICS

Three hours lecture; 3 credits.

The study of Geometrical optics which includes light rays, plane and spherical surfaces, thin and thick lenses, effects of stops, ray tracing and lens aberrations; physical optics which includes lightwaves, superposition of waves, interferences of two light beams. Frauhofer diffraction by a single opening, double slits; and diffraction grading and coherent optics which discuss the diffraction theory and lens-less holography. **Prerequisites:** EEGR 305 and EEGR 317. (OFFERED AS NEEDED). Students must pass each class with a grade of "C" or better.

EEGR 461 SOLID STATE ELECTRONICS I

Three hours lecture, one hour laboratory; 3 credits.

Treats semi-conductor properties, valence bands, energy bands, equilibrium distribution of electrons and non-equilibrium transport of charges. **Prerequisite:** EEGR 215. (OFFERED AS NEEDED). Students must pass EEGR 215 with a grade of "C" or better.

EEGR 462 SOLID STATE ELECTRONICS II

Three hours lecture, one hour laboratory; 3 credits.

Examines the theory and analysis of basic semiconductor building block devices. These structures include: PN junctions, metal-semiconductor diodes, MOSFETs, bipolar junction transistors, and metal-semiconductor field effect transistors. **Prerequisite:** EEGR 461. (OFFERED AS NEEDED). Students must pass EEGR 461 with a grade of "C" or better.

EEGR 463 DIGITAL ELECTRONICS

Three hours lecture; 3 credits.

Deals with the analysis, design, simulation, and applications of digital micro-electronic systems. These include TTL, CMOS, and ECL logic families, A/D and D/A converters, semiconductor memory devices such as RAM, ROM, EPROM, EEPROM, and programmable logic devices. Design projects are an integral part of this course. **Prerequisites:** EEGR 211, EEGR 243 and EEGR 317. (SPRING). Students must pass each class with a grade of "C" or better.

EEGR 465 PHYSICAL ELECTRONICS

Three hours lecture, two hours laboratory; 3 credits.

Analysis of semiconductor device characteristics. Includes homojunction and heterojunction materials, MESFET devices, HEMT FETs, heterojunction bipolar transistors and quantum well structures. **Prerequisite:** EEGR 211, EEGR 243 and EEGR 317. (SPRING). Students must pass EEGR 317 with a grade of "C" or better.

EEGR 471 DESIGN OF INTEGRATED CIRCUITS

Three hours lecture, one hour laboratory; 3 credits.

Includes microelectronic circuit design and silicon integrated device characteristics and fabrication. **Pre-requisite:** EEGR 317. (FALL). Students must pass EEGR 317 with a grade of "C" or better.

EEGR 480 INTRODUCTION TO CYBER SECURITY

Three hours lecture; 3 credits.

This course will provide a basic introduction to of all aspects of cyber-security including business, policy and procedures, communications security, network security, security management, legal issues, political issues, and technical issues. This serves as the introduction to the cyber security program. **Prerequisite:** EEGR 317. (FALL). Students must pass EEGR 317 with a grade of "C" or better.

EEGR 481 INTRODUCTION TO NETWORK SECURITY

Three hours lecture; 3 credits.

This course will provide the basic concepts in the many aspects of security associated with today's modern computer networks including local area networks and the internet. It includes the fundamentals of network architecture, vulnerabilities, and security mechanisms including firewalls, guards, intrusion detection, access control, malware scanners and biometrics. **Prerequisite:** EEGR 317. (FALL). Students must pass EEGR 317 with a grade of "C" or better.

EEGR 482 INTRODUCTION TO CRYPTOGRAPHY

Three hours lecture; 3 credits.

This course will provide practical knowledge on a wide range of cryptography mechanisms and will explore their relationship with today's modern communications and networks. It includes the fundamentals of cryptography, classic and modern encryption, decryption, public and private key structures, digital signature and secure hash functions. **Prerequisite:** EEGR 317. (SPRING). Students must pass EEGR 317 with a grade of "C" or better.

EEGR 483 INTRODUCTION TO SECURITY MANAGEMENT

Three hours lecture; 3 credits.

This course will provide a basic background in the many aspects of security management associated with today's modern communications and networks. It includes the fundamentals of Risk Analysis, Risk Management, Security Policy, Security Operations, Legal issues, Business issues and Secure Systems Development. **Prerequisite:** EEGR 317. (SPRING). Students must pass EEGR 317 with a grade of "C" or better.

EEGR 487 TELECOMMUNICATIONS

Three hours lecture; 3 credits.

Consists of telecommunications systems design for point-to-point and mass data distribution, modulation techniques, propagation modes, and control methods. **Prerequisite:** EEGR 453. (OFFERED AS NEEDED). Students must pass EEGR 453 with a grade of "C" or better.

EEGR 489 CELLULAR WIRELESS COMMUNICATIONS

Three hours lecture; 3 credits.

Includes the basic concepts of wireless and RF systems; global system for mobile communications (GSM); code division multiple access (CDMA); and GPRS data protocols. **Prerequisites:** EEGR 322. (OFFERED AS NEEDED). Students must pass EEGR 322 with a grade of "C" or better.

EEGR 490 SENIOR DESIGN PROJECT I

Five hours; 2 credits.

This is the first part of a two-part sequence capstone design project. In the first part, students will select their project advisor and develop a written proposal for their major design, which indicates how the design will be executed. Students will also learn project planning and the design cycle and consider engineering standards as the proposal is developed. This is a practicum where the minimum level of effort required is five hours per credit. A copy of the proposal, with appropriate signatures, must be submitted to the Department. **Prerequisites:** EEGR 317 and EEGR 390. **This course is offered only for graduating seniors and must be taken one semester prior to the student's final semester. Department approval required.** (FALL/SPRING). Students must pass each class with a grade of "C" or better.

EEGR 491 SENIOR DESIGN PROJECT II

Ten hours; 2 credits.

This is the second part of a two-part sequence capstone design project. Individual or team design, development, and analyzing of projects. Students are required to present their work in an open forum to faculty, peers and invited guests. A final technical report is required which professionally documents the design project. A copy of the report, with appropriate signatures, must be submitted to the Department office. **Prerequisites: EEGR 490**. **This course is offered only for graduating seniors and must be taken in the student's final semester. Department approval required.** (EEGR491 must be taken either FALL or SPRING).

EEGR 498 INDEPENDENT PROJECT

Two hours lecture, three hours laboratory; 3 credits.

Individual student study performed under faculty supervision. The level of effort and subject matter must be equivalent to a 400 level Department course. Prerequisite: Departmental approval before registration required. (OFFERED AS NEEDED).

EEGR 499 SPECIAL TOPICS IN ELECTRICAL ENGINEERING

Three hours lecture; 3 credits

Special course not offered on a regular basis. Students must have achieved Junior/Senior status in the major requirement. Prerequisite: Departmental approval before registration. (OFFERED AS NEEDED).

Appendix C: Faculty Members & Research Interests

1. **Md Tanvir Arafin**, Assistant Professor; Ph.D. in Electrical and Computer Engineering, University of Maryland College Park; M.Sc. in Electrical and Computer Engineering, University of Maryland College Park; B.Sc. in Electrical and Electronic Engineering, Bangladesh University of Engineering and Technology. Research Interests: Hardware-based authentication and de-anonymization, hardware properties for secure IoT systems, low-power system design, and embedded systems.
2. **Yacob Astatke**, Associate Professor and Associate Dean for Undergraduate Studies; D.Eng., Morgan State University; M.S.E.E., Johns Hopkins University; B.S.E.E., Morgan State University. Research Interests: Performance and QoS management in mixed wireless networks and online engineering course development and delivery.
3. **Cliston Cole**, Professor; Ph.D., University of California Berkeley; M. Phil, Cambridge University; B.S. (Applied Mathematics), Warwick University. Research Interests: Image processing with applications in remote sensing and avionics and signal processing for wireless communications.
4. **Arlene Cole-Rhodes**, Professor; Ph.D., University of California Berkeley; M. Phil, Cambridge University; B.S. (Applied Mathematics), Warwick University. Research Interests: Image processing with applications in remote sensing and avionics and signal processing for wireless communications.
5. **Richard A. Dean**, Lecturer; Ph.D., Oklahoma State University; M.S., University of Maryland; B.S., Manhattan College. Research Interests: Spectrum and QoS management with clustering, and network security for Mixed Wireless Networks; Aeronautical radio link simulation for network enhanced telemetry system.
6. **Mulugeta Dugda**, Lecturer; Ph.D., North Carolina Agricultural and Technical State University; Ph.D., Seismology and Geophysics; MSc., Addis Ababa University; BSc., Addis Ababa University. Research Interest: Digital Signal Processing, Data Analytics, Big Data, Machine Learning (ML), Optimization and Communications
7. **Duane Harvey**, Associate Professor; D.Eng. Morgan State University; MSEE, University of California Los Angeles (UCLA); BSEE, Morgan State University; Research Interest: Adaptable communications, wireless power transmission, secure integrated circuits.
8. **Petronella A. James**, Faculty of Assessment/Online Programs; D.Eng. Morgan State University; MCRP, Morgan State University; B.S.M., University of the West Indies. Research Interest: Engineering education, blended and online learning; Program assessment and accreditation, sustainable transportation and livable cities.
9. **Kevin T. Kornegay**, Professor; Ph.D., UC-Berkeley, MSEE, UC-Berkeley, BSEE, Pratt Institute. Research Interests: Cyber Physical Systems, Embedded Systems Design and Security, Hardware Assurance, Reverse Engineering, Millimeter Wave Integrated Circuit Design, Radio-Frequency Integrated Circuit Design, and Mixed-Signal Integrated Circuit Design.
10. **Kemi Ladeji-Osias**, Professor; Ph.D. (Biomedical Engineering), Rutgers University; B.S.E.E., University of Maryland College Park. Research Interests: Synthetic Vision Systems, Haptic training, and integration of technology in the classroom.
11. **Kofi Nyarko**, Professor; D.Eng, Morgan State University; M.S.E.E, Morgan State University; B.S.E.E, Morgan State University. Research Interests: Computational engineering, scientific/engineering simulation & visualization, complex computer algorithm development, computer network theory (including Ad-Hoc Mobile Networks), portable computing design and development, advanced computer display technologies, and avionic system software development.
12. **Onyema Osuagwu,** Associate Professor; Ph.D., University of Illinois at Urbana-Champaign, M.S., University of Illinois at Urbana-Champaign, M.A., Hunter College-CUNY, B.A. Hunter College-CUNY. Research Interests: Artificial intelligence, machine learning, cybersecurity, cognition and computation in the human brain, brain-machine interfaces, emergent phenomena and systems, the physics and mathematics of information and data science, robotics and embodied cognition, reverse engineering (software/hardware) and neuromorphic circuitry, synthetic biology and biological computation.

13. **Michel Kornegay**, Associate Professor; D.Eng, Morgan State University; M.S.E.E., Penn State University; B.S.E.E, Morgan State University. Research Interests: Electronic design, device characterization and modeling using MMIC and MIC technologies at RF, microwave, and millimeter wave frequencies.
14. **Craig J. Scott**, Chair, Professor, Ph.D., Howard University; M.S.E.E., Cornell University; B.S.E.E., Howard University. Research Interests: Engineering Visualization for network security, computer vision and image/spatial data fusion; technology assisted formative assessment and differentiated instruction.
15. **Michael G. Spencer**, Professor; Ph.D., Cornell University; M.Eng., Cornell University. Research Interests: Compound semiconductors, graphene, power conversion, microwave devices and solar cell technology.
16. **Carl White**, Professor; Associate Dean for Research and Graduate Studies, Ph.D., Cornell University; M.S.E.E., B.S.E.E., Howard University.
17. **Ketchiozo Wandji**, Associate Professor; PhD., George Washington University; M.S.E.E. Morgan State University; M.S. in Cybersecurity Technology and Digital Forensics, University of Maryland University College; B.S.E.E, Morgan State University. Research Interests: Cybersecurity, software reliability, digital forensics and electromagnetic interference.
18. **Gregory M. Wilkins**, Professor of Practice; Ph.D., University of Illinois; M.S.E.E. The Johns Hopkins University; B.S.E.E., University of Maryland College Park. Research Interests: Applications of computational electro-magnetics methods for the solution field behavior in guided wave structures and radiating systems (antennas).

Appendix D: Electrical and Computer Engineering Faculty and Staff

FACULTY:

Name / Title / Email	Phone	Office
Dr. Craig J. Scott Chair / Professor craig.scott@morgan.edu	443-885-3073	SEB 224
Dr. Arlene Cole-Rhodes Assoc. Dean for Graduate Studies and Research/ Professor arlene.cole-rhodes@morgan.edu	443-885-4207	SEB 338
Dr. Kevin T. Kornegay Director of CAP Center/ Endowed IoT Chair/Professor kevin.kornegay@morgan.edu	443-885-4869	SEB 332
Dr. Jumoke Ladeji-Osias Professor jumoke.ladeji-osias@morgan.edu	443-885-1456	SEB 335
Dr. Michael G. Spencer Professor michael.spencer@morgan.edu	443-885-4224	MEB 224
Dr. Carl White Special Advisor for Strategic Enrollment/Professor carl.white@morgan.edu	443-885-3913	THSS 305
Dr. Yacob Astatke Assistant VP for International Affairs/ Associate Professor yacob.astatke@morgan.edu	443-885-4031	ESRL 212
Dr. Duane Harvey Associate Professor duane.harvey@morgan.edu	443-885-2750	SEB 343
Dr. Michel Kornegay Associate Professor michel.Kornegay@morgan.edu	443-885-4732	SEB 336
Dr. Kofi Nyarko Professor kofi.nyarko@morgan.edu	443-885-3476	SEB 223
Dr. Onyema Osuagwu Associate Professor onyema.osuagwu@morgan.edu	443-885-4208	SEB 339
Dr. Ketchiozo Wandji Associate Professor ketchiozo.wandji@morgan.edu	443-885-2350	SEB 230
Dr. Tanvir Arafin Assistant Professor tanvir.arafin@morgan.edu	443-885-4752	SEB 310
Dr. Getachew Befekadu Assistant Professor getachew.befekadu@morgan.edu	443-885-1459	SEB 233
Dr. Cliston Cole Assistant Professor cliston.cole@morgan.edu	443-885-3073	SEB 344

Name / Title / Email	Phone	Office
Dr. Deanna Bailey Lecturer deanna.bailey@morgan.edu	443-885-2740	SEB 345
Dr. Mulugeta Dugda Lecturer mulugeta.dugda@morgan.edu	443-885-2746	SEB 333
Dr. Gregory M. Wilkins Professor of Practice gregory.wilkins@morgan.edu	443-885-3915	SEB 220
Dr. Petronella James-Okeke Assessment & Program Management petronella.james@morgan.edu	443-885-4989	SEB 226

ECE Department Adjunct:

Name / Title / Email	Phone	Office
Prof. Jean Ayoub Lecturer jean.ayoub@morgan.edu	443-885-3073	SEB 224
Dr. Richard A. Dean Lecturer richard.dean@morgan.edu	443-885-3073	SEB 310
Ikemefuna Uba Lecturer ikemefuna.uba@morgan.edu	443-885-3073	SEB 102A SEB 230
Roberta Joseph Lecturer roberta.joseph@morgan.edu	443-885-3073	SEB 112
Peter Taiwo Lecturer peter.taiwo@morgan.edu	443-885-2245	SEB 231
Dr. Jean-Pierre Liamba (Mathematics) Lecturer jean-pierre.liamba@morgan.edu	443-885-4743	SEB 235

ECE Department Staff:

Name / Title / Email	Phone	Office
Ms. April Lopez Administrative Assistant april.lopez@morgan.edu	443-885-3073	SEB 224
Mr. Andre Lewis ECE Lab Technician andre.lewis@morgan.edu	443-885-3667	MEB 240

The Cybersecurity Assurance and Policy (CAP) Center Personnel:

Name / Title / Email	Phone	Office
Ms. Joyce Comegys Administrative Assistant joyce.comegys@morgan.edu	443-885-2107	MCM 513
Dr. Hailu Kassa Post-Doctoral Researcher hailu.kassa@morgan.edu	443-883-2108	SEB 351
Mr. Vinton Morris CAP Center Information Technology Manager vinton.morris@morgan.edu	443-885-3052	SEB 327

MORGAN STATE UNIVERSITY

SCHOOL OF ENGINEERING

Department of Electrical & Computer Engineering

120-CREDIT PROGRAM

UNDERGRADUATE PROGRAM HANDBOOK

ACADEMIC YEAR

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